

Exercise walk-through

Properties of metals ■ 9.1

eXercise

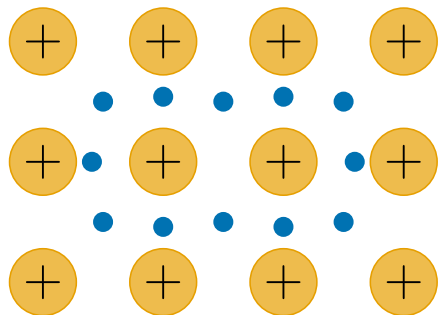
You must be able to

- contrast the physical properties of metals and non-metals
- give the products of metals with acids, water/steam and oxygen
- link properties to uses

Method — Metal properties

- **metals:** good conductors, malleable/ductile, high melting points.
- **reactions:** + acid $\rightarrow$ salt + hydrogen; + oxygen $\rightarrow$ metal oxide; + water/steam $\rightarrow$ hydroxide/oxide + hydrogen.

Method — Metal properties



'sea' of **delocalised electrons**, free to move and carry charge

positive metal ions in a fixed lattice

A metal as positive ions in a sea of delocalised electrons

Method — Metal properties

most reactive			
↓	K	potassium	
	Na	sodium	
	Ca	calcium	above carbon:
	Mg	magnesium	extract by
	Al	aluminium	electrolysis
	C	carbon (non-metal)	
	-----	-----	-----
	Zn	zinc	below carbon:
	Fe	iron	extract by re-
	H	hydrogen (non-metal)	duction with
	Cu	copper	carbon
	Ag	silver	
	Au	gold	
least reactive			

Reactivity is a key chemical property of a metal

Practice 2.1 ■ 2 marks

State two physical properties of metals.

Solution 2.1

Method: Metal properties

Worked steps

any two of: good conductor of heat/electricity; malleable; ductile; high melting point **B1** **B1**.

Practice 2.2 ■ 1 mark

Give the products when a metal reacts with a dilute acid.

Solution 2.2

Method: Metal properties

Worked steps

a salt + hydrogen **B1**.

Exam-style 3.1 ■ 1 mark

Which property is typical of a non-metal?

A good electrical conductor

B malleable

C brittle

D high density

Solution 3.1

Method: Metal properties

A good electrical conductor

B malleable

C brittle



D high density

Worked steps

C. Non-metals are usually brittle.

Exam-style 3.2 ■ 2 marks

Magnesium reacts with dilute hydrochloric acid.

- (a) Name the two products.
- (b) Name the gas given off and a test for it.

Solution 3.2

Worked steps

(a) magnesium chloride **B1**; hydrogen **B1**.

(b) hydrogen **M1**; it gives a 'squeaky pop' with a lighted splint **A1**.

Exam-style 3.3 ■ 1 mark

State why metals are good electrical conductors.

Solution 3.3

Method: Metal properties

Worked steps

they have delocalised (free) electrons that can move and carry charge **B1**.